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ADDITIONAL NOTES ON THE DEAL METEORITE.

BY F. J. KEELEY.

In the JOURNAL OF THE ACADEMY OF NATURAL SCIENCES OF PHILADELPHIA, 1830, Volume VI, page 182, Mr. Robert Vaux and Dr. Thos. M'Euen described the fall of a small stone meteorite at Deal, Monmouth County, New Jersey, August 14, 1829, 11.30 P. M., a portion of which they presented to the Academy.

In 1851, Shepard, who had received part of this specimen from the Curators of the Academy, published some further information, including a determination of its specific gravity, which he reported as 3.25 to 3.30.

At the present time, but thirty grams of this meteorite is known to be in existance, hence, sufficient material for adequate investigation is not available without too greatly impairing the specimens, but it seems desirable that at least some additional description be recorded.

The Academy's specimen, which weighs 20.8 grams, and therefore constitutes over two thirds of the known material, consists of one end of a stone that may have been originally three times as large. Its length is about 35 mm., width 25 mm. and thickness 15 mm. and on more than half of it, the original surface is preserved, rounded and pitted by fusion, and covered with a dull black crust averaging .3 mm. in thickness.

The broken surface, of about 30 mm. by 25 mm., when examined with the microscope, is extremely fine and uniformly grained and of pale pearl gray color, penetrated by a few narrow black veins which are continuous with the crust and branch and anastomose. Scattered through the mass are innumerable minute grains of metal and sulphide, the largest of the former not exceeding 1 mm. and few being over .2 mm., while the grains of sulphide average even smaller with no tendency to form larger nodules. There are also a few small black particles and a slight rusty tint is visible over much of the surface but no exudations of molysite to indicate the presence of lawrencite. A careful study of the entire broken surface under a binocular compound microscope with magnification of about 40, failed to reveal a single chondrule or larger crystalline mass, but near one end there is a spherical depression about 1.5 mm. in diameter which looks as if it might have been the matrix of a chondrule.

Unless this very slight character is accepted as sufficient, there is nothing visible on the specimen to justify classing it as a chondrite. On the broken face was a partly separated spall, a few millimeters in diameter, which was removed, and from it a rather unsatisfactory section prepared for microscopical examination. This section, which would have been entirely too small to represent the meteorite generally, had not the preliminary examination demonstrated a remarkable degree of uniformity throughout the stone, shows a fine granular texture made up of minute angular fragments of enstatite and olivine, mostly too small for satisfactory determination. There are two or three individuals in the section which exceed .5mm in length, but many less than .1 mm. A portion of one of the veins passes through the section. It is black and opaque, and about .02 mm. thick throughout most of its length, with several lenticular thickenings, which generally include grains of metal and sulphides. Numerous small grains of metal are likewise scattered among the silicates, together with even more plentiful, but smaller, grains of troilite or pyrrhotite. A few opaque black grains, with some indications of crystal faces, are probably chromite.

The most interesting feature exhibited by the section, is the presence of not inconsiderable quantities of a glassy transparent substance that may be identified as maskelynite, resembling in all respects that of Alfianello. This mineral, which has a refractive index so close to that of balsam that the ground surfaces appear as if perfectly polished, generally occupies irregular spaces between the magnesian silicates and sometimes holds small grains of the latter as inclusions, but in one case takes the form of a nearly circular grain suggesting a rounded crystal, with its interior clouded with numerous small inclusions. When examined in ordinary light under high powers, using good objectives and carefully adjusted illumination, there occasionally appear in it systems of fine parallel lamina, sometimes intersecting. On applying polarized light, such spaces generally show faint double refraction, somewhat similar to that of leucite. Not the comparatively strong double refraction of large leucite crystals, but more closely resembling that of the small crystals in fine grained Vesuvian lavas, which likewise sometimes show similar parallel laminations with ordinary light. These laminations might be interpreted as indicating incipient polysynthetic twinning in a feldspathic material, but the resemblance shown by all the characters of maskelynite to those of leucite, seems to furnish some justification for Groth's opinion that the two minerals are closely related.